

## **Industry/Research Representatives**

**Charles Dorgan**  
**University of Wisconsin**  
**150 E. Gilman**  
**Madison, WI 53703**

**William Esposito Jr.**  
**Ambient Labs, Inc.**  
**159 W. 25th Street**  
**8th Floor**  
**New York, NY 10001**

**David N. Easton**  
**University of Virginia**  
**Office of Environmental Health & Safety**  
**P.O. Box 3425**  
**Charlottesville, VA 22903**

**William Fisk**  
**MS 90-3058**  
**Lawrence Berkeley Laboratory**  
**Berkeley, CA 94720**

**Max Eisenberg**  
**Centre for Indoor Air Research**  
**1099 Winterson Road, Suite 280**  
**Linthicum, MD 21090**

**Mark Fly**  
**Governair**  
**4841 N. Sewell**  
**Oklahoma City, OK 73118**

**Larry Eldridge**  
**Trammell Crow Company**  
**3700 Texas Commerce Tower**  
**2200 Ross Ave**  
**Dallas, TX 75201-2708**

**Elliot B. Gordon**  
**American Gas Association Laboratories**  
**8501 E. Pleasant Valley Road**  
**Independence, OH 44131**

**Wilmoth Elmes**  
**Flack & Kurtz Consulting Eng.**  
**475 5th Ave.**  
**New York, NY 10017**

**Ian G. Greig**  
**Daniels Associates Inc.**  
**11240 N. 19th Ave.**  
**Phoenix, AZ 85029**

**David S. Ensor**  
**Center for Aerosol Technology**  
**Research Triangle Institute**  
**P.O. Box 12194**  
**Research Triangle Park, NC 27709-2194**

**Vijay Gupta**  
**Office of Design & Construction**  
**Public Bldg. Service**  
**General Services Administration**  
**Washington, D.C. 20405**

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## **Industry/Research Representatives**

**Guy Gupton**  
**Gupton Engr. Associates, Inc.**  
**1951 Emery Street**  
**Atlanta, GA 30318**

**Thomas Kuehn**  
**University of Minnesota**  
**111 Church Street S.E.**  
**Minneapolis, MN 55455-0111**

**Lee Hathon**  
**OSHA Health Response Team**  
**P.O. Box 65200**  
**1781 S. 300 W.**  
**Salt Lake City, UT 84165-200**

**Carl N. Lawson**  
**NVT Technologies, Inc.**  
**P.O. Box 14248**  
**Research Triangle Park, NC 27709**

**Dr. Jolanda Janczewski**  
**Consolidated Safety Services Inc.**  
**10461 White Granite Drive**  
**Suite 205**  
**Oakton, VA 22124**

**Gale Lindsey**  
**Design Harmony**  
**16 N. Boylan Ave.**  
**Raleigh, NC 27603**

**Richard Kelso**  
**College of Architecture & Planning**  
**University of Tennessee**  
**314 A & A Building**  
**Knoxville, Tennessee 37996-2400**

**Vivian Loftness**  
**Carnegie-Mellon University**  
**Dept. of Architecture**  
**5000 Forbes Avenue - MMC 410**  
**Pittsburgh, PA 15213**

**Mukesh Khattar**  
**EPRI**  
**3412 Hillview Ave.**  
**Palo Alto, CA 94303**

**Calvin MacCracken**  
**Calmac Manufacturing Corporation**  
**101 West Sheffield Ave.**  
**P.O. Box 710**  
**Englewood, NJ 07631**

**Brian Krafthefer**  
**Honeywell Inc.**  
**3660 Technology Dr.**  
**Minneapolis, MN 55418**

**Fred McKnight**  
**H.L. Turner Group**  
**R.R. 1, Box 535A**  
**Harrison, ME 04040**

**2023687767**

**Industry/Research Representatives**

Gary Merritt  
Private Consulting Engineer  
2517 Foxwood Drive  
Chapel Hill, NC 27514

Charles Rose  
SnyderGeneral Corp.  
Filtration Products Group  
215 Central Ave.  
Louisville, KY 40208

Alice Michalish  
Duke University  
Facility Design Office  
200 Facility Center  
Durham, NC 27708-0146

Stuart T. Rose  
EC13E  
526 S. Church Street  
P.O. Box 1006  
Charlotte, NC 28201-1006

John Molter  
DuPont Fibers  
LR-2524 ZRP  
P.O. Box 80-705  
Willmington, DE 19880-0705

Bruce Siebert  
The Trane Company, 13-2  
3600 Pammel Creek Rd  
La Crosse, WI 54601

Andrew Persily  
Indoor Air Quality Group Leader  
NIST  
Bldg. 226, Rm A-313  
Gaithersberg, MD 20899

Dennis Sikkema  
Hart & Cooley, Inc.  
500 E. 8th Street  
Holland, MI 49423-3777

Alfred Raufiesen  
Henneman, Raufiesen & Associates, Inc.  
1605 South State Street  
Champaign, IL 61820

Harmohindar Singh  
N.C. A&T State University  
2703 New Garden Rd. E.  
Greensboro, NC 27455

Peter Rojeski, Jr.  
Architectural Engineering Dept.  
N.C. A&T State University  
Greensboro, North Carolina 27411

Allen L. South  
SCS Associates  
P.O. Box 140  
Cochranville, PA 19330

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### **Industry/Research Representatives**

**Leo Stambaugh**  
**Enviro-Mgmt & Research, Inc.**  
**6605 Aintree Circle**  
**Dallas, TX 75214-1622**

**Alan Traugott**  
**Flack & Kurtz Consulting Eng.**  
**475 5th Ave.**  
**New York, NY 10017**

**Bob Strandberg**  
**SnyderGeneral Corp.**  
**13600 Industrial Park Blvd.**  
**Minneapolis, MN 55441**

**Douglas W. VanOsdell**  
**Research Triangle Institute**  
**P.O. Box 12194**  
**Research Triangle Park, NC 27709-2194**

**Harold Straub**  
**Titus**  
**990 Security Row**  
**Richardson, TX 75081-2284**

**Bruce Weir**  
**Systems Applications International**  
**101 Lucas Valley Road**  
**San Rafael, CA 94903**

**Muthusamy V. Swami**  
**Florida Solar Energy Center**  
**300 State Road 401**  
**Cape Canaveral, FL 32920**

**Jarrell Wenger**  
**Johnson Controls**  
**P.O. Box 423 M36**  
**Milwaukee, WI 53201**

**John Talbott**  
**Program Manager (CE-121)**  
**Department of Energy**  
**1000 Independence Ave. S.W.**  
**Washington, D.C. 20585**

**Mark Zboran**  
**Georgia Power Company**  
**45 Technology Parkway South**  
**Norcross, GA 30092**

**John Tiffany**  
**Mid Atlantic Envir. Hygiene Resource Ctr.**  
**25 Hickory Place, Suite F28**  
**Chatham, NJ 07928-3004**

2023687769

**E.P.A. and University of Illinois Facilitators**

Leslie L. Christianson  
University of Illinois  
Professor/Director of BERL  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

Mike McCulley  
University of Illinois  
425 Flagg Hall, MC-624  
Urbana, IL 61801

John C. Chang  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Jon McLaughlin  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

Timothy M. Dyess  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Marc Y. Menetrez  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Bruce D. Henschel  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Ronald B. Mosley  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Russ Kulp  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Everett L. Plyler  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Zhenhai Li  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

John Brian Priest  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

Ronaldo Maghirang  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

David C. Sanchez  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

2023687770

**E.P.A. and University of Illinois Facilitators**

Bryan Shaw  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

Leslie E. Sparks  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Ray Steiber  
U.S. EPA, AEERL (MD-54)  
Research Triangle Park, NC 27711

Bob Thompson  
U.S. EPA  
Indoor Air Division 62035  
401 M St., SW  
Washington, DC 20460

Bruce A. Tichenor  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Mike Tumbleson  
University of Illinois  
3217 VMSB, MC-002  
Urbana, IL 61801

W. Gene Tucker  
U.S. EPA(MD-54)  
Research Triangle Park, NC 27711

Alexander Zhivov  
University of Illinois  
1304 W. Pennsylvania Ave.  
Urbana, IL 61801

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## **2: Standards**

Following is list of some standards that are used in the United States and internationally in providing for building ventilation and indoor air quality.

### ASHRAE Standards:

ANSI/ASHRAE 62-1973, Natural and Mechanical Ventilation.

ANSI/ASHRAE 62-1989, Ventilation for Acceptable Indoor Air Quality.

ANSI/ASHRAE 12-1983 (RA 88), Method of Testing for Rating Room Air conditioners and Packaged Terminal Air Conditioners.

ASHRAE 52-1968 (RA 76), Method of Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.

ANSI/ASHRAE 55-1992, Thermal Environmental Conditions for Human Occupancy..

ANSI/ASHRAE/IES 100.3-1985, Energy Conservation in Existing Buildings-Commercial.

ANSI/ASHRAE/IES 100.5-1991, Energy Conservation in Existing Buildings-Institutional.

ANSI/ASHRAE/IES 100.6-1991, Energy Conservation in Existing Buildings-Public Assembly.

ANSI/ASHRAE/IES 100.4-1984, Energy Conservation in Existing Buildings-Industrial.

ANSI/ASHRAE/IES 90A-1980, Energy Conservation in New Building Design.

ASHRAE/IES 90.1-1989, Energy Efficient Design of New Buildings Except Low Rise Residential Buildings.

ANSI/ASHRAE 70-1991, Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

### American Conference of Governmental Industrial Hygienists (ACGIH):

Threshold Limit Values of Airborne Contaminants.

Canadian Standard Association (CSA):

CAN/CSA C368.1-1990, Performance Standard for Room Air Conditioners.

C22.2 No. 117-1970, Room Air Conditioners.

C22.2 No. 113-M1984, Fans and Ventilators.

Air Condition Contractors of American (ACCA):

ACCA Manual N, Load Calculation for Commercial Summer and Winter Air Conditioning, 4th ed. (1988).

ACCA Manual Q Commercial Low Pressure, Low Velocity Duct System Design.

ACCA Manual CS, Commercial Applications Systems and Equipment.

Air Diffusion Council (ADC):

ADC 1062 R4, Certification, Rating, and Test Manual.

Council of American Building Officials (CABO):

CABO 1989, Model Energy Code. Falls Church, Virginia.

Sheet Metal and Air Condition Contractors' National Association (SMACNA):

SMACNA, HVAC Systems-Applications, 1st. ed. (1986).

SMACNA, HVAC Systems-Duct Design (1990).

SMACNA, HVAC Air Duct Leakage Test Manual (1985).

SMACNA, HVAC Duct Construction Standards-Metal and Flexible, 1st ed. (1985).

SMACNA, Rectangular Industrial Duct Construction (1980).

SMACNA, Round Industrial Duct Construction (1977).

SMACNA, Thermoplastic Duct (PVC) Construction Manual (Rev. A, 1974).

SMACNA, Energy Recovery Equipment and Systems, Air-to-Air (1991).

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**SMACNA, HVAC Systems-Testing, Adjusting and Balancing (1983):**

**American Refrigeration Institute (ARI):**

ANSI/ARI 610-89, Central System Humidifiers.

ANSI/ARI 880-89, Air Terminals. Arlington, Virginia.

**American Society of Mechanical Engineers (ASME):**

ANSI/AMSE PTC 11-1984, Fans

**National Fire Protection Association (NFPA):**

ANSI/NFPA 90A-1989, Installation of Air Conditioning and Ventilating Systems (1989).

ANSI/NFPA 90B-1989, Installation of Warm Air Heating and Air-Conditioning Systems (1989).

**Underwriters Laboratories (UL):**

ANSI/UL 484-1986, Room Air Conditions (1982).

ANSI/UL 586-1990, High Efficiency, Particulate Air Filter Units (1985).

**International Conference of Building Officials (ICBO/IAPMO):**

ICBO/IAPMO, Uniform Mechanical Code (1988) (with Uniform Mechanical Code Standards).

**National Electrical Manufacturers Association (NEMA):**

NEMA ICS 1-1988, General Standards for Industrial Control and Systems.

**National Environmental Balancing Bureau (NEBB):**

NEBB-1991, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems, 4th ed. (1983)

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**International Standards:**

**International Standard Organization (ISO):**

ISO 7726:1985, Thermal environments-Instruments and methods for measuring physical quantities. Geneva.

ISO 7730:1984, Moderate thermal environments- Determination of PMV and PPD indices and specification of conditions for thermal comfort.. Geneva.

ISO 9487:1991, Workplace air-Determination of vaporous aromatic hydrocarbons-Charcoal tube/solvent desorption/gas chromatographic method. Geneva.

ISO 3649:1980, Cleaning equipment for air or other gases-Vocabulary. Geneva.

ISO 6584:1981, Cleaning equipment for air and other gases-Classification of dust separators. Geneva.

ISO 4225:1980, Air quality- General aspects- Vocabulary. Geneva.

ISO 4226:1980, Air quality- General aspects- Units of Measure. Geneva.

ISO 4227:1989, Planning of ambient air quality monitoring. Geneva.

ISO 6879:1983, Air quality- Performance characteristics and related concepts for air quality measuring methods. Geneva.

ISO 7168:1985, Air quality- Presentation of ambient air quality data in alphanumeric form. Geneva.

ISO/TR 7708:1983, Air quality- Particle size fraction definitions for health-related sampling.. Geneva.

ISO 8186:1989, Ambient Air- Determination of the mass concentration of carbon monoxide. Geneva.

ISO 8760:1990, Work-place Air- Determination of the mass concentration of carbon monoxide-Method using detector tubes for short-term sampling with direct indication. Geneva.

ISO 3258:1976, Air Distribution and air diffusion- Vocabulary. Geneva.

ISO 5135:1984, Acoustics-Determination of sound power levels of noise from air terminal devices, high/low velocity/pressure assemblies, dampers and valves by measurement in a reverberation room. Geneva.

ISO 5219:1984, Air Distribution and air diffusion- Laboratory aerodynamic testing and rating of air terminal devices. Geneva.

ISO 5220:1981, Air Distribution and air diffusion-Aerodynamic testing and rating of constant and variable dual or single duct boxes and single duct units. Geneva.

ISO 5 221:1984, Air Distribution and air diffusion- Rules to methods of measuring air flow rate in an air handling duct. Geneva.

ISO 7807:1983, Air Distribution- Straight circular sheet metal ducts with a lock type spiral seam and straight rectangular sheet metal ducts. Geneva.

German Ventilation Standards (DIN):

DIN 24 185-Teil 2, Method of testing air filters used in general ventilation; filter classification, marking, test. Berlin.

DIN 24 185-Teil 1, Method of testing air filters used in general ventilation; terms, units, methods. Berlin.

DIN 24 190, Ducting for ventilation equipment; folded and welded sheet metal ducts. Berlin.

DIN 8957-Teil 3, Room air conditioners; tests for cooling operation. Berlin.

DIN 8957-Teil 4, Air conditioners; tests for heating operation of the refrigerating system/heat pump. Berlin.

DIN 8957-Blatt 1, Room air conditioners, terminology. Berlin.

DIN 8957-Blatt 2, Room air conditioners; rating conditions, and marking. Berlin.

DIN 1946-Teil 2, Room ventilation technique; technical health principles (VDI ventilation rules). Berlin.

DIN 24 193-Teil 1, Ducting for ventilation equipment; flanges. Berlin.

DIN 1946-Teil 1, Room ventilation technique; Terminology and symbols. Berlin.

DIN 24 192, Ducting for ventilation equipment; joints for sheet metal ducting and sheet metal ducting components.. Berlin.

DIN 4797, Heating technique and room ventilation technique; down stream outlets; determination of the flow resistance. Berlin.

DIN 24 194-Teil 1, Ducting for ventilation equipment; air leakage testing of sheet metal ducting components. Berlin.

DIN 24 194-Teil 2, Ducting for ventilation equipment; air leakage classification of sheet metal ducting systems. Berlin.

Russian Ventilation Standards (GOST):

1986, Sanitary Norms: Microclimate of Industrial Spaces.

GOST 12.1.005-88. 1988, System of the safety standards general sanitary-hygienic requirement to the air of the occupied zone. Moscow..

Russian Building Norms and Regulations (SNiP):

SNiP2.04.05.92, Heating Ventilating and Air Condition.

Supplement to SNiP 2.04.05.86, Ventilation Air Condition of Commercial, Administrative and Industrial Buildings.

The Chartered Institution of Building Services Engineers (CIBSE):

CIBSE Guides - Section B2, 1986 "Ventilation and Air Conditioning (requirements)"

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